contrast media injection control unit **30**. The injection control unit **30** is powered advantageously by rechargeable battery **32**. The injection control unit **30** also incorporates control circuitry which controls electric motors **35, 36** which are also located within the injection control unit. The injection control unit is contained within an electromagnetic shield **37** to prevent the undesired electromagnetic radiation generated by the electric motors from interfering with the magnetic field used to generate the magnetic resonance image.

The injection control unit **30** is separated from the injection head unit **38** by as great a distance as possible. In the preferred embodiment, this is typically ten to fifteen feet. The injection head unit must be located in close proximity to the patient in order to decrease the distance that the contrast media fluid must travel from the contrast media injectors. The injection head unit **38** includes contrast media injection syringe and piston units **40, 42**. The syringes **40, 42** are connected to the electric motors in the injection control unit by flexible mechanical drive shafts **44, 46**, respectively. The drive shafts are made from a nonferrous metal such as hard brass.

The separation of the electric motors from the injection head, as well as the additional electromagnetic shielding, results in improved system performance and overall resulting image quality. Additionally, the use of an infrared/optical communications link results in a system which is both portable and easy to use.

What we claim is:

[1. A patient infusion control apparatus for use in a magnetic resonance imaging apparatus to generate images of a patient, the patient infusion control apparatus comprising:

a) means for injecting fluid into the patient undergoing a MRI procedure;

b) an electric drive motor and motor control circuitry positioned remotely from the means for injecting to be substantially non-reactive with an electromagnetic field of the imaging apparatus; and,

c) a non-rigid drive connection between the electric drive motor and the means for injecting comprising a flexible drive shaft.] 173

[2. The patient infusion control apparatus of claim 1 wherein the electric drive motor and motor control circuitry are enclosed within electromagnetic shielding.] 173

[3. The patient infusion control apparatus of claim 1, wherein the patient injection means is adapted to be located in close proximity to the patient.] 173

[4. The patient infusion control apparatus of claim 1, wherein said flexible drive shaft is comprised of hard brass.] 173

[5. The patient infusion control apparatus of claim 1, wherein the motor is positioned at least ten to fifteen feet from the patient injection means.] 173

[6. The patient infusion control apparatus of claim 1, wherein the electric drive motor and the motor control circuitry are enclosed in an electromagnetic shield.] 173

[7. The patient infusion control apparatus of claim 1, further comprising a rechargeable battery wherein the electric drive motor receives power from the rechargeable battery.] 173

8. A patient infusion system for use with a magnetic resonance imaging system, the patient infusion system comprising:

a) a room shielded from electromagnetic interference;

b) a system controller located externally of the shielded room;

c) a patient infusion apparatus including infusion apparatus control means for controlling an infusion opera-

tion, the patient infusion apparatus located within the shielded room; and,

d) a fiber optic communications link between the system controller and the infusion apparatus control means.

9. A patient infusion system for use with a magnetic resonance imaging system, the patient infusion system comprising:

a) a room shielded from electromagnetic interference, which includes a viewing window;

b) a system controller external to the shielded room;

c) a patient infusion apparatus within the shielded room and including infusion apparatus control means for controlling an infusion operation; and,

d) a communicating link between the system controller and the infusion apparatus control means.

10. The patient infusion system of claim 9, wherein the communications link includes means for transmitting and receiving electromagnetic radiation through the viewing window.

11. The patient infusion system of claim 9, wherein the communications link includes means for transmitting and receiving infrared electromagnetic energy.

12. The patient infusion system of claim 9, wherein the communications link includes means for transmitting and receiving electromagnetic energy in the visual range.

13. A patient infusion system for use with a magnetic resonance imaging system to generate images of a patient, the patient infusion system comprising:

a) a room shielded from electromagnetic interference by an electromagnetic shield including a viewing window;

b) a system controller located outside the room;

c) a patient infusion apparatus located inside the room including infusion apparatus control means for controlling an infusion operation;

d) a communications link between the system controller and the infusion apparatus control means; and,

e) an electric drive motor and motor control circuitry separated from the patient infusion apparatus and a non-rigid drive connection between the electric drive motor and the patient infusion apparatus whereby the motor is positioned to be substantially non-reactive with an electromagnetic field of the imaging system.

14. The patient infusion system of claim 13, wherein the communications link comprises an external transceiver located outside the room and an internal transceiver located inside the room, both said transceivers communicating electromagnetic energy through the viewing window in the room.

15. The patient infusion system of claim 14, wherein the electromagnetic energy communicated between said transceivers is in the visible light spectrum.

16. The patient infusion system of claim 14, wherein said electromagnetic energy communicated between said transceivers is in the infrared spectrum.

17. The patient infusion system of claim 13, further comprising a rechargeable battery located in the room and connected to the electric drive motor for providing power to the electric drive motor.

18. The patient infusion system of claim 13, wherein the electric drive motor and motor control circuitry are enclosed within the electromagnetic shield.

19. The patient infusion system of claim 13, wherein the infusion apparatus control means is adapted to be located at least ten to fifteen feet from the patient.

20. The patient infusion system of claim 13, wherein the non-rigid drive connection is comprised of hard brass.

21. The patient infusion system of claim 13, wherein the patient infusion apparatus is adapted to be located in close proximity to the patient.

22. A method of patient infusion for use with a magnetic resonance imaging system, the method comprising the steps of:

a) providing patient infusion apparatus having a patient infusion apparatus controller and means operable to inject fluid into a patient;

b) positioning the patient infusion apparatus controller away from the patient infusion apparatus to prevent interference in the image, the infusion apparatus controller including at least one electric motor and motor control circuitry; and

c) operably connecting the electric motor for controlling the patient infusion apparatus to the patient infusion apparatus with a non-rigid drive connection, the electric motor operating the patient infusion apparatus to infuse media into a patient.

23. A method of patient infusion for use with a magnetic resonance imaging system, the method comprising the steps of:

a) providing a room shielded from electromagnetic interference including a viewing window;

b) providing a system controller located outside the room;

c) providing a patient infusion apparatus including infusion apparatus control means for controlling an infusion operation, the patient infusion apparatus located inside the room; and

d) transmitting control signals from the system controller to the infusion apparatus control means through the viewing window.

* * * * *

add a'

add c'

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